Remarks

In the interest of clarity, the paragraph numbers hereafter match the paragraph numbers in the Office Action.

1. Claim 19 has been amended to include the reference characters in parentheses.

2-3. The Office Action rejected each of claims 1-6, 9-19, 22, 25 and 26 as anticipated by Lipo. Applicant respectfully traverses this rejection.

Claim 1 includes a preamble that recites a controller that supplies voltages to an induction machine via supply lines. In Fig. 5 of the present specification the controller includes, among other components, PWM inverter 26 that supplies voltages to motor 28 via three supply lines. Claim 1 also requires, among other things, sensing the line voltages (i.e., the voltage on the supply lines that supply the induction machine), identifying a zero sequence voltage component of the line voltages, rectifying the zero sequence voltage component and using the rectified signal to identify a high frequency first harmonic component. Lipo fails to teach or suggest any of the limitations of claim 1.

First, Lipo fails to teach or suggest sensing line voltage on supply lines that link a controller to an induction machine. In Lipo's Fig. 9 the supply lines are lines 36 and 39 and Lipo teaches that currents (i.e., I_{abc} and I_{xyz}), not voltages, are sensed on lines 36 and 39. With respect to the voltages on lines 45, Lipo teaches that lines 45 are utility lines, not supply lines that provide power from a controller to an induction motor (see Lipo, col. 11, lines 20-22 that states that "The DC power on the bus lines may be provided from a rectifier 44 that receives power from utility lines 45"). Thus, Lipo clearly fails to teach or suggest sensing line voltages as requires by claim 1.

Second, because Lipo fails to teach or suggest sensing line voltages, not surprisingly, Lipo fails to teach or suggest identifying a zero sequence voltage component of the line voltages. In this regard, the section of Lipo cited as teaching identifying the zero sequence voltage component of the line voltages (col. 11, lines 27-28) teaches nothing about identifying a zero sequence voltage component. In addition, Applicant notes that Lipo teaches identifying a zero sequence current component in several locations but does not appear to contemplate a zero sequence voltage component. Voltage and current have different characteristics for the purpose of the present invention.

Third, while Lipo teaches a rectifier (see 44 in Lipo's Fig. 8), Lipo's rectifier is for rectifying AC voltage provided on utility lines 45, not for rectifying a zero sequence voltage component or any other zero sequence component for that matter. To this end, see Lipo's col. 11, lines 20-22 that states that "The DC power on the bus lines may be provided from a rectifier 44 that receives power from utility lines 45". Rectification of utility line voltages to supply an inverter is clearly different than rectifying a zero sequence voltage component derived from supply line voltages sensed from lines that provide voltage to an induction machine.

Fourth, Lipo fails to teach or suggest using any signals to generate a high frequency first harmonic component. To this end, Applicant performed a word search on the text in Lipo and the phrase "first harmonic" or any phrase akin thereto does not even appear once in Lipo's text.

For at least these reasons Applicant believes that claim 1 and claims that depend therefrom (i.e. 2-8) are patentably distinct from Lipo.

With respect to claim 9, claim 9 includes a preamble that recites a controller that supplies voltages to an induction machine via supply lines. In Fig. 5 of the present specification the controller includes, among other components, PWM inverter 26 that supplies voltages to motor 28 via three supply lines. Claim 9 also requires, among

other things, identifying a derivative of the supply line voltages, filtering the derivative using first and second bandpass filters that have different center frequencies, combining the filtered signals to generate a combined signal and using the combined signal to identify a first harmonic component. Lipo fails to teach or suggest all of the limitations described above.

First, Lipo fails to teach or suggest identifying a derivative of the supply line voltages. In Lipo's Fig. 9 the supply lines are lines 36 and 39 and Lipo teaches that currents (i.e., I_{abc} and I_{xyz}), not voltages, are sensed on lines 36 and 39. With respect to the voltages on lines 45, Lipo teaches that lines 45 are utility lines, not supply lines that provide power from a controller to an induction motor (see Lipo, col. 11, lines 20-22 that states that "The DC power on the bus lines may be provided from a rectifier 44 that receives power from utility lines 45"). Thus, Lipo does not teach identifying a derivative of voltages.

Second, while Lipo teaches digital filters 68, each of those filters is provided to filter a different current value, not a voltage derivative. In addition, none of the current values that are filtered by Lipo's filters 68 is filtered by more than one filter. Claim 9 requires that a single voltage derivative be filtered by two different types of filters (i.e., filters that have different center frequencies). Moreover, while Lipo teaches filters 68, Lipo fails to teach or even remotely suggest the nature of the filters (i.e., band pass, notch, high pass, low pass, etc.) or other characteristics (i.e., center frequencies, whether or not all of the filters are similarly tuned or differently tuned, etc.). Thus, Lipo clearly does not teach filtering a dingle voltage derivative in two different ways or that filters can or should be tuned differently.

Third, the outputs of Lipo's filters 68 are not mathematically combined to generate a combined signal. Here, Applicant points out that each of the summers 71 in Lipo's Fig. 9 adds one filtered value with one command value and clearly do not add or otherwise mathematically combine two or more filtered values as required by claim 9.

Fourth, Lipo fails to teach or suggest using any signals to generate a high frequency first harmonic component. To this end, Applicant performed a word search on the text in Lipo and the phrase "first harmonic" or any phrase akin thereto does not even appear once in Lipo's text.

For at least these reasons Applicant believes that claim 9 and claims that depend therefrom (i.e. 10-13) are patentably distinct from Lipo.

Claim 14 includes a preamble that recites a controller that supplies voltages to an induction machine via supply lines. In Fig. 5 of the present specification the controller includes, among other components, PWM inverter 26 that supplies voltages to motor 28 via three supply lines. Claim 14 also requires, among other things, identifying a zero sequence voltage component from the supply lines, rectifying the zero sequence voltage component, filtering the rectified signal using first and second filters that have different center frequencies and adding the first and second filtered signals to generate a first harmonic component. Lipo fails to teach or suggest any of the limitations described above.

First, Lipo fails to teach or suggest identifying a zero sequence voltage component associated with the supply lines. In this regard, the section of Lipo cited as teaching identifying the zero sequence voltage component of the line voltages (col. 11, lines 27-28) teaches nothing about identifying a zero sequence voltage component. In addition, Applicant notes that Lipo teaches identifying a zero sequence current component in several locations but does not appear to contemplate a zero sequence voltage component. Voltage and current have different characteristics for the purpose of the present invention.

Second, while Lipo teaches a rectifier (see 44 in Lipo's Fig. 8), Lipo's rectifier is for rectifying AC voltage provided on utility lines 45, not for rectifying a zero sequence voltage component or any other zero sequence component for that matter. To this end, see Lipo's col. 11, lines 20-22 that states that "The DC power on the bus lines may be

provided from a rectifier 44 that receives power from utility lines 45". Rectification of utility line voltages to supply an inverter is clearly different than rectifying a zero sequence voltage component derived from supply line voltages sensed from lines that provide voltage to an induction machine.

Third, while Lipo teaches digital filters 68, each of those filters is provided to filter a different current value, not a voltage derivative. In addition, none of the current values that are filtered by Lipo's filters 68 is filtered by more than one filter. Claim 9 requires that a single voltage derivative be filtered by two different types of filters (i.e., filters that have different center frequencies). Moreover, while Lipo teaches filters 68, Lipo fails to teach or even remotely suggest the nature of the filters (i.e., band pass, notch, high pass, low pass, etc.) or other characteristics (i.e., center frequencies, whether or not all of the filters are similarly tuned or differently tuned, etc.). Thus, Lipo clearly does not teach filtering a dingle voltage derivative in two different ways or that filters can or should be tuned differently.

Fourth, the outputs of Lipo's filters 68 are not added to generate a first harmonic component. Here, Applicant points out that each of the summers 71 in Lipo's Fig. 9 adds one filtered value with one command value and clearly do not add or otherwise mathematically combine two or more filtered values as required by claim 14. In addition, Lipo fails to teach or suggest using any signals to generate a first harmonic component. To this end, Applicant performed a word search on the text in Lipo and the phrase "first harmonic" or any phrase akin thereto does not even appear once in Lipo's text.

For at least these reasons Applicant believes that claim 14 is patentably distinct from Lipo.

Claim 15 includes a preamble that recites a controller that supplies voltages to an induction machine via supply lines. In Fig. 5 of the present specification the controller includes, among other components, PWM inverter 26 that supplies voltages

to motor 28 via three supply lines. Claim 15 also requires, among other things, a determiner for identifying a zero sequence voltage component from the supply lines, a rectifier for rectifying the zero sequence voltage component and a filter for filtering using the rectified signal to generate a high frequency first harmonic component. Lipo fails to teach or suggest any of the limitations described above.

First, Lipo fails to teach or suggest a determiner for identifying a zero sequence voltage component associated with the supply lines. In this regard, the section of Lipo cited as teaching identifying the zero sequence voltage component of the line voltages (col. 11, lines 27-28) teaches nothing about identifying a zero sequence voltage component. In addition, Applicant notes that Lipo teaches identifying a zero sequence current component in several locations but does not appear to contemplate a zero sequence voltage component. Voltage and current have different characteristics for the purpose of the present invention.

Second, while Lipo teaches a rectifier (see 44 in Lipo's Fig. 8), Lipo's rectifier is for rectifying AC voltage provided on utility lines 45, not for rectifying a zero sequence voltage component or any other zero sequence component for that matter. To this end, see Lipo's col. 11, lines 20-22 that states that "The DC power on the bus lines may be provided from a rectifier 44 that receives power from utility lines 45". Rectification of utility line voltages to supply an inverter is clearly different than rectifying a zero sequence voltage component derived from supply line voltages sensed from lines that provide voltage to an induction machine.

Third, while Lipo teaches digital filters 68, Lipo fails to teach or suggest that any of the filters is used to generate a high frequency first harmonic component. In this regard, the inputs to filters 68 are d and q-axis current components and therefore the outputs are also likely simply filtered d and q-axis components. None of the d and q-axis components are high frequency components as required by claim 15. In addition, Lipo fails to teach or suggest using any signals to generate a first harmonic component.

To this end, Applicant performed a word search on the text in Lipo and the phrase "first harmonic" or any phrase akin thereto does not even appear once in Lipo's text.

For at least these reasons Applicant believes that claim 15 and claims that depend from claim 15 (i.e., claims 16-21) are patentably distinct from Lipo.

With respect to claim 22, claim 22 includes a preamble that recites a controller that supplies voltages to an induction machine via supply lines. In Fig. 5 of the present specification the controller includes, among other components, PWM inverter 26 that supplies voltages to motor 28 via three supply lines. Claim 22 also requires, among other things, a component for identifying a derivative of the supply line voltages, first and second filters for filtering the derivative using first and second bandpass filters that have different center frequencies, and a combiner for combining the filtered signals to generate an output signal that is indicative of a first harmonic component. Lipo fails to teach or suggest all of the limitations described above.

First, Lipo fails to teach or suggest identifying a derivative of the supply line voltages. In Lipo's Fig. 9 the supply lines are lines 36 and 39 and Lipo teaches that currents (i.e., I_{abc} and I_{xyz}), not voltages, are sensed on lines 36 and 39. With respect to the voltages on lines 45, Lipo teaches that lines 45 are utility lines, not supply lines that provide power from a controller to an induction motor (see Lipo, col. 11, lines 20-22 that states that "The DC power on the bus lines may be provided from a rectifier 44 that receives power from utility lines 45"). Thus, Lipo does not teach identifying a derivative of voltages.

Second, while Lipo teaches digital filters 68, each of those filters is provided to filter a different current value, not a voltage derivative. In addition, none of the current values that are filtered by Lipo's filters 68 is filtered by more than one filter. Claim 9 requires that a single voltage derivative be filtered by two different types of filters (i.e., filters that have different center frequencies). Moreover, while Lipo teaches filters 68, Lipo fails to teach or even remotely suggest the nature of the filters (i.e., band pass, notch, high pass, low pass, etc.) or other characteristics (i.e., center frequencies,

whether or not all of the filters are similarly tuned or differently tuned, etc.). Thus, Lipo clearly does not teach filtering a dingle voltage derivative in two different ways or that filters can or should be tuned differently.

Third, the outputs of Lipo's filters 68 are not combined to generate an output signal that is indicative of a first harmonic signal. Here, Applicant points out that each of the summers 71 in Lipo's Fig. 9 adds one filtered value with one command value and clearly do not add or otherwise mathematically combine two or more filtered values as required by claim 22.

For at least these reasons Applicant believes that claim 22 and claims that depend therefrom (i.e. 23-26) are patentably distinct from Lipo.

Applicant has introduced no new matter in making the above remarks. In view of the above remarks, Applicant believes claims 1-26 of the present application recite patentable subject matter and allowance of the same is requested. No fee in addition to the fees already authorized in this and accompanying documentation is believed to be required to enter this amendment, however, if an additional fee is required, please charge Deposit Account No. 17-0055 in the amount of the fee.

Respectfully submitted,

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